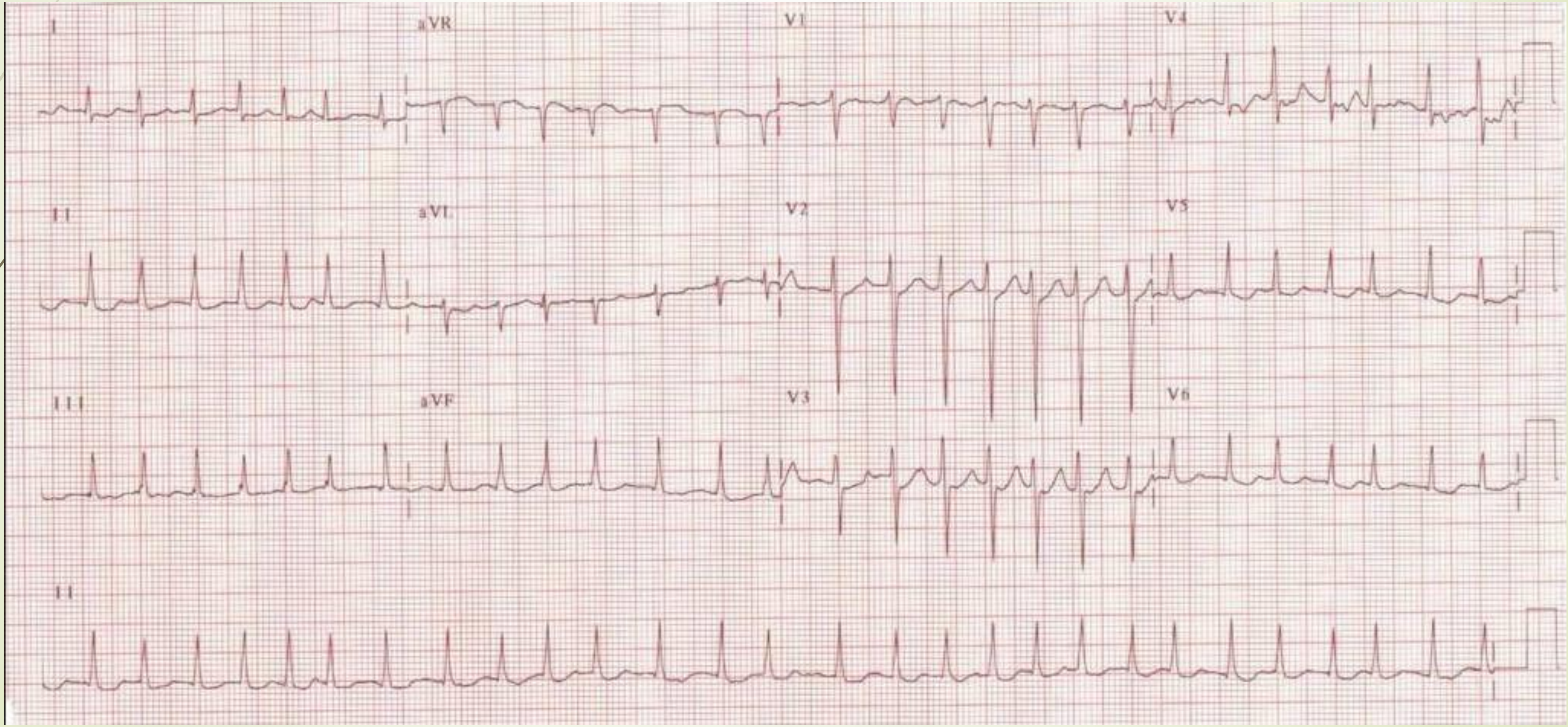
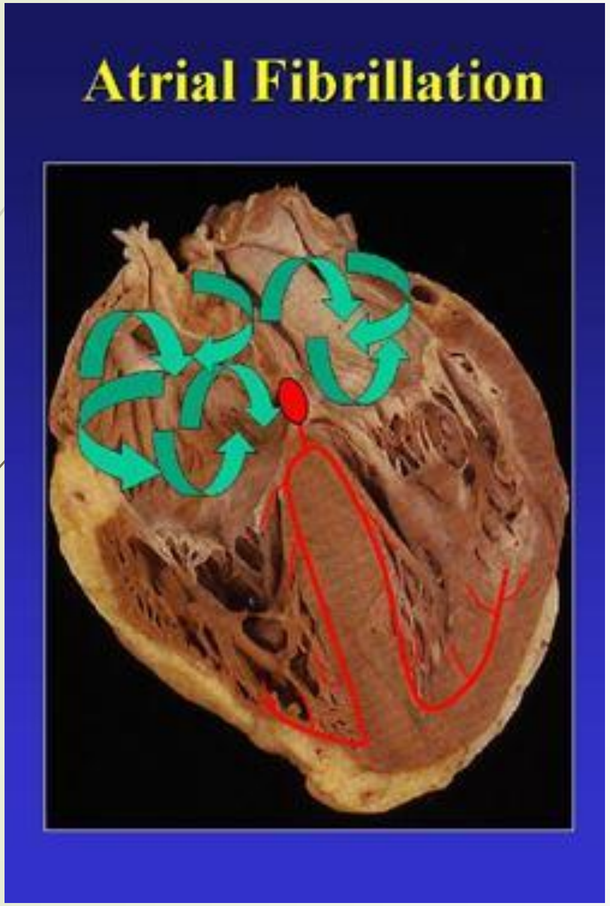
Arrhythmia Management in the Postoperative Cardiac Surgery Patient

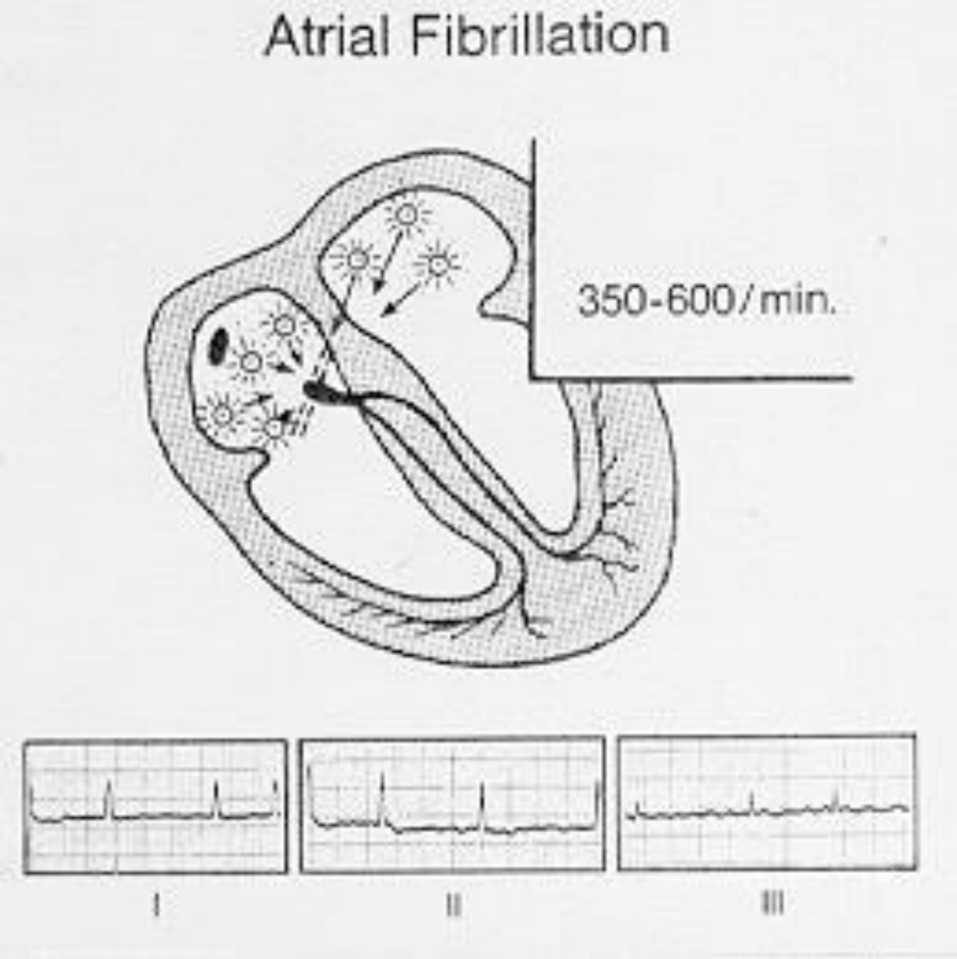
นพ ทวีเกียรติ วาสวกุล

วชิรพยาบาล

72-yr-old male, 3 vessels CAD s/p CABG 48 ชม. post-op, BP 110/70, HR 173, no HF, LVEF 30%




Atrial Fibrillation


Atrial Fibrillation
350-600/min.
I
II
III

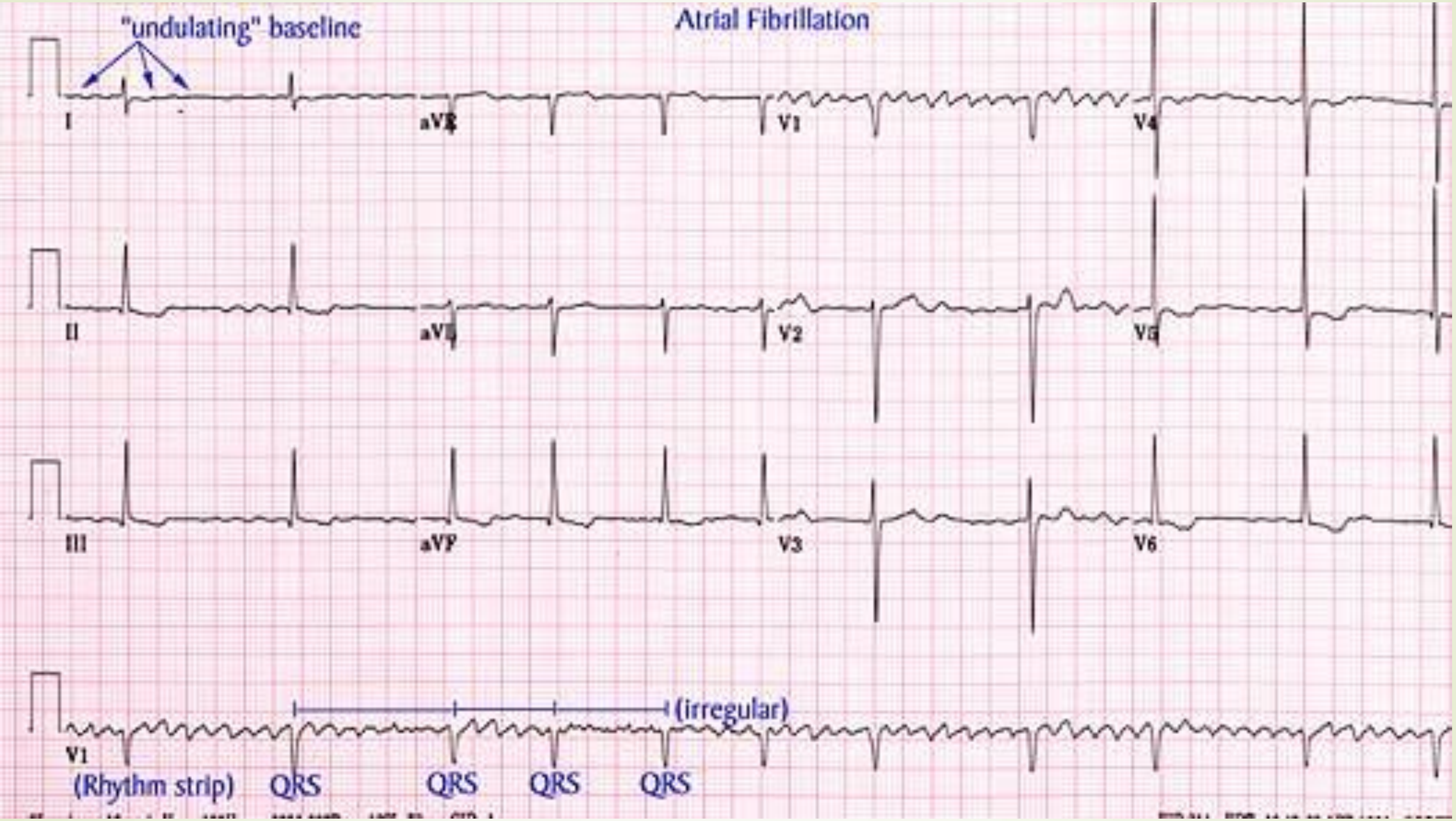
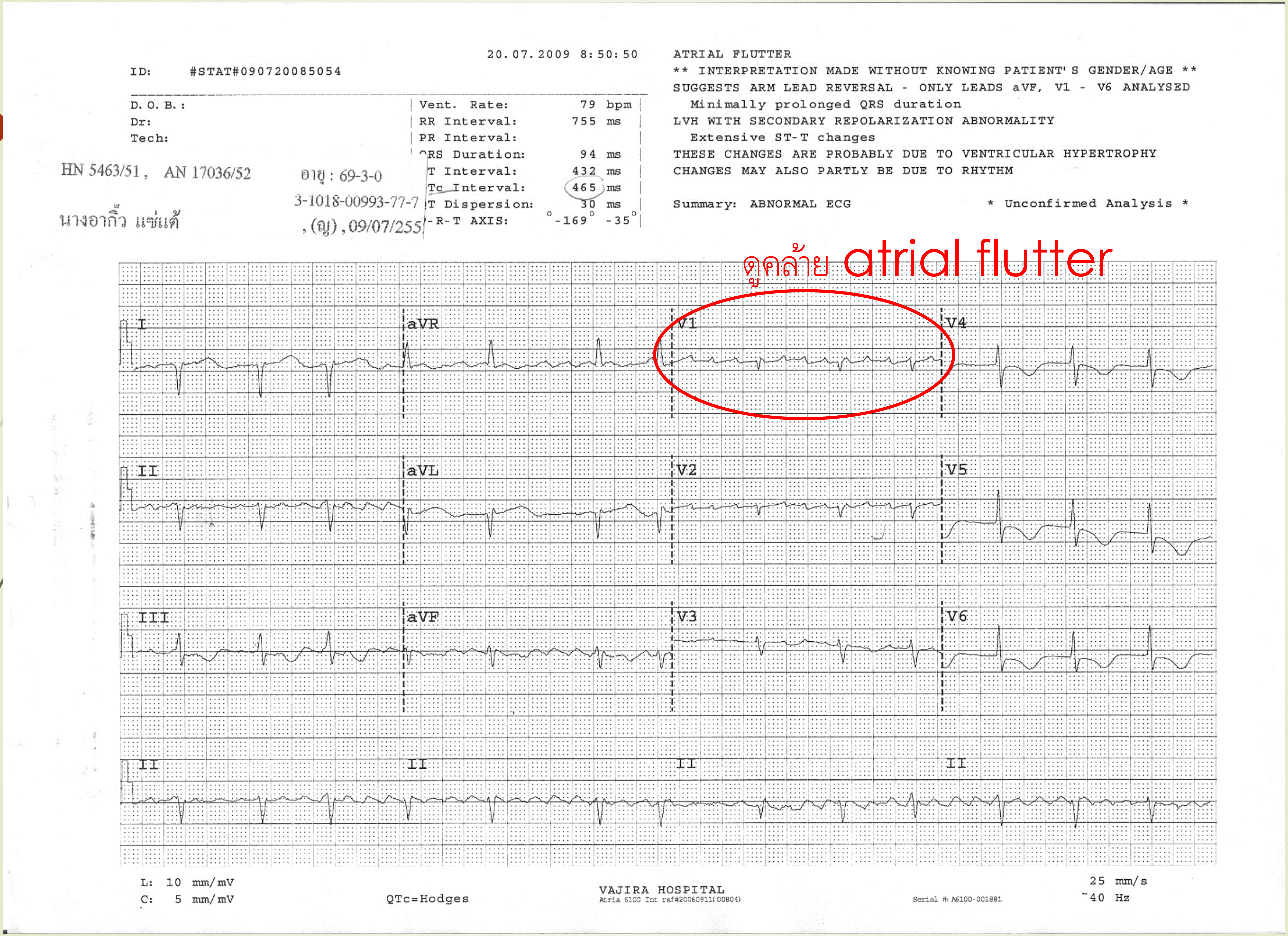


Image taken from: http://cardiology.ucsf.edu/ep/debris/ecg.htm



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D.O.B.:
Dr:
Tech:

HN 5463/51 , AN 17036/52
นางอากิ๋ว แซ่แต้
อายุ : 69-3-0
3-1018-00993-77-7
,(ญ),09/07/255

Vent. Rate: 79 bpm
RR Interval: 755 ms
PR Interval:
RS Duration: 94 ms
T Interval: 432 ms
Tc Interval: 465 ms
T Dispersion: 30 ms
-R-T AXIS: -169° -35°

ATRIAL FLUTTER
** INTERPRETATION MADE WITHOUT KNOWING PATIENT'S GENDER/AGE **
SUGGESTS ARM LEAD REVERSAL - ONLY LEADS aVF, V1 - V6 ANALYSED
Minimally prolonged QRS duration
LVH WITH SECONDARY REPOLARIZATION ABNORMALITY
Extensive ST-T changes
THESE CHANGES ARE PROBABLY DUE TO VENTRICULAR HYPERTROPHY
CHANGES MAY ALSO PARTLY BE DUE TO RHYTHM

Summary: ABNORMAL ECG * Unconfirmed Analysis *

ดูคล้าย atrial flutter

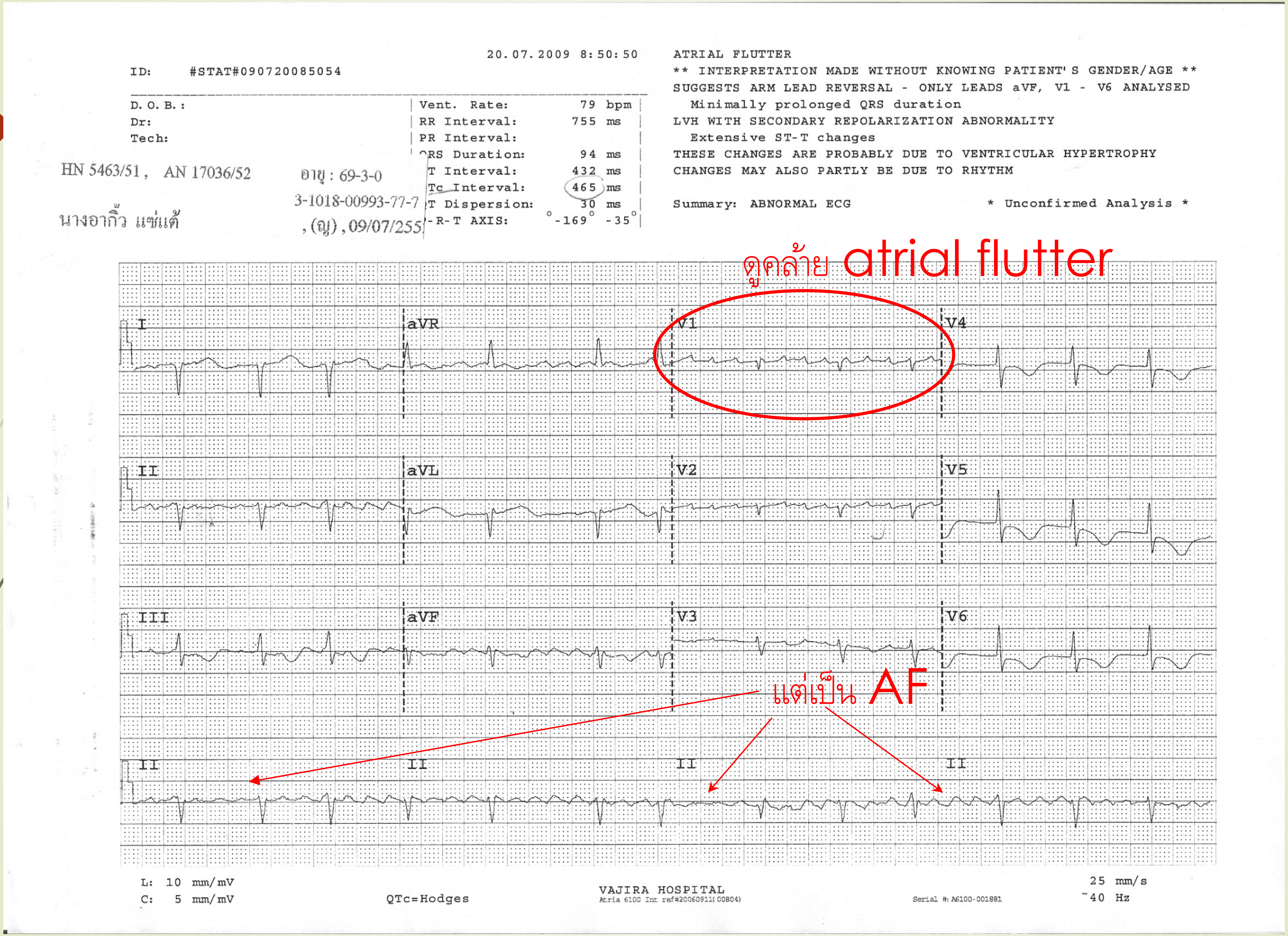
L: 10 mm/mV
C: 5 mm/mV

QTc=Hodges

VAJIRA HOSPITAL
Atria 6100 Int ref#20060911(00804)

Serial #: A6100-001881

25 mm/s
~40 Hz



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~40 Hz

Post-operative atrial fibrillation (POAF)

- Most common complication after cardiac surgery
- 30% after CABG
  40% after valve surgery
  50% after combined procedures
- Self-limiting ภายใน 4-6 สัปดาห์หลังผ่าตัด

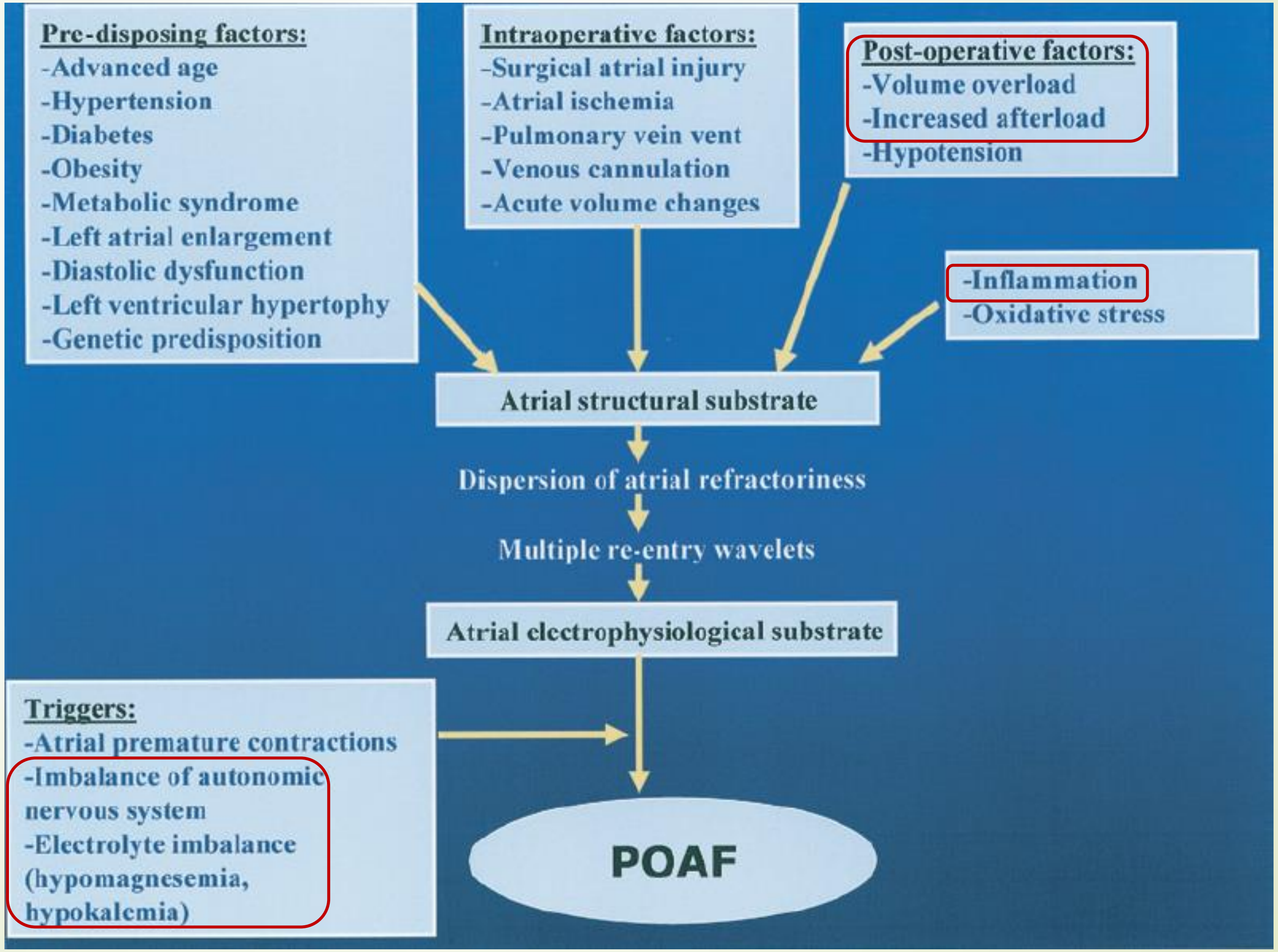
Post-operative atrial fibrillation (POAF)

- Risk factors
  - advanced age > 70 yrs.
  - male
  - Hx AF
  - LV systolic dysfunction
  - LA enlargement
  - COPD, CKD, DM, Obesity etc
- Multifactorial mechanisms

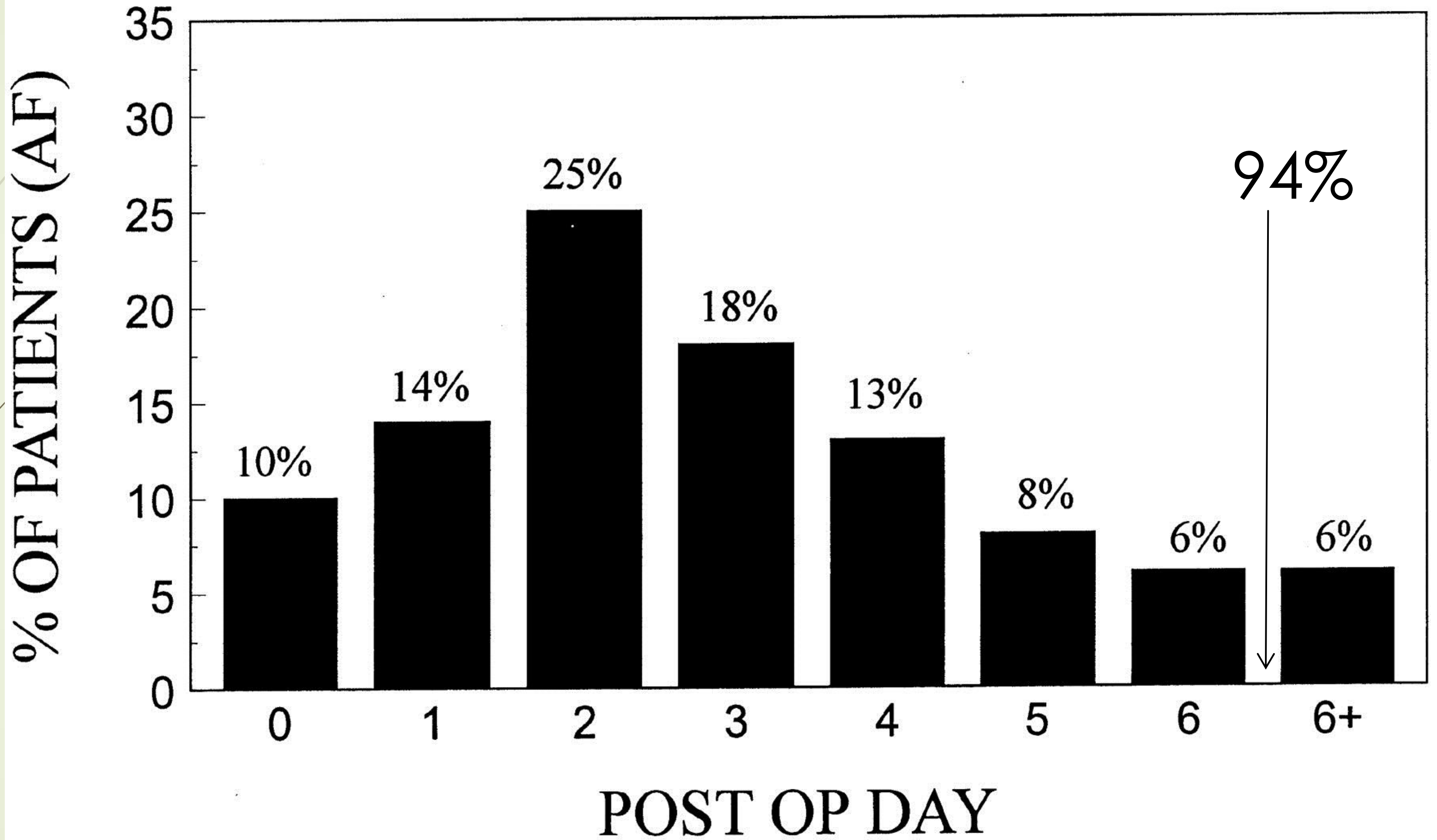
JACC Journals

From: Mechanisms, Prevention, and Treatment of Atrial Fibrillation After Cardiac Surgery

J Am Coll Cardiol. 2008;51(8):793-801. doi:10.1016/j.jacc.2007.10.043



Time of occurrence of postoperative AF.

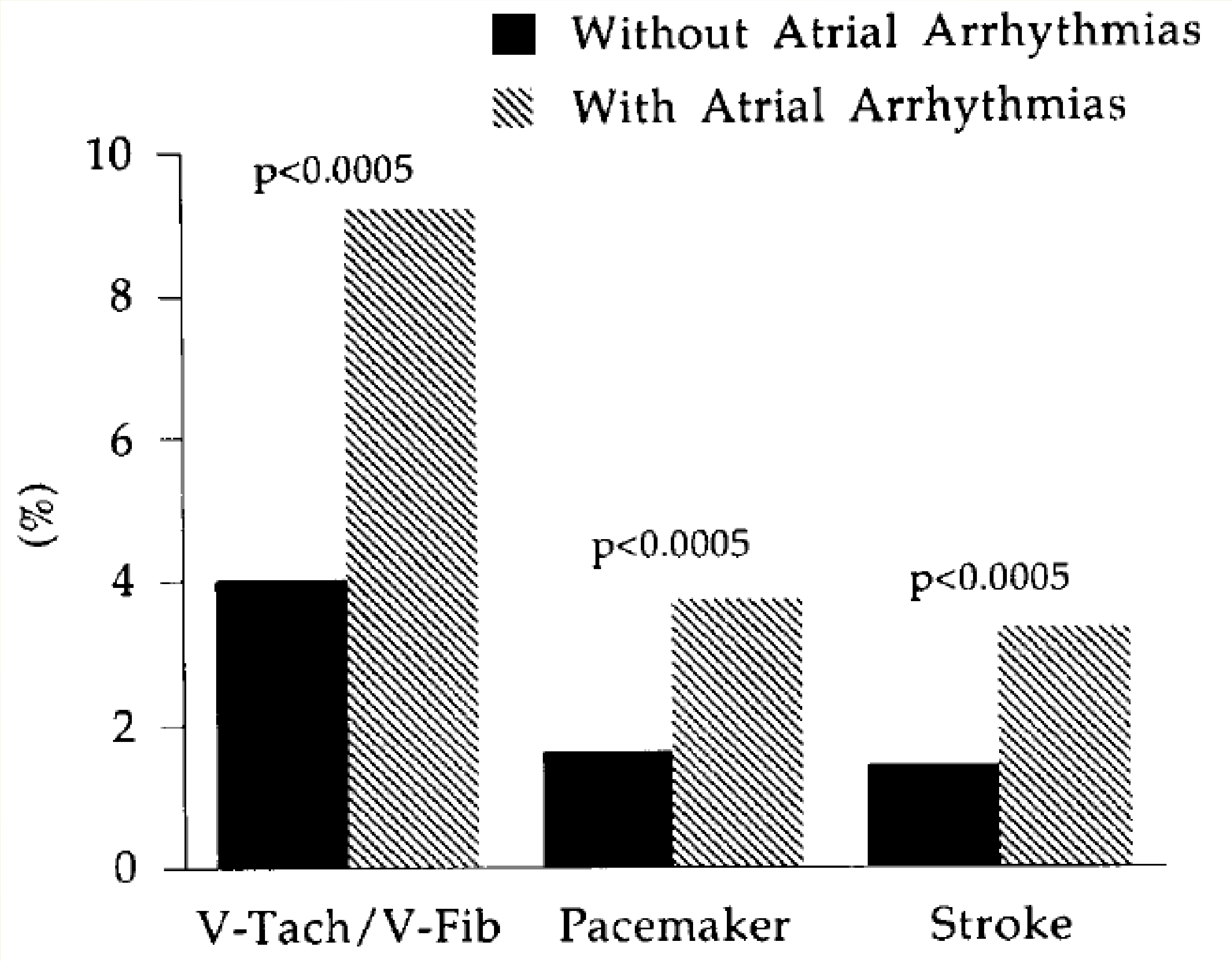


Aranki S F et al. Circulation 1996;94:390-397

American Heart Association

Learn and Live

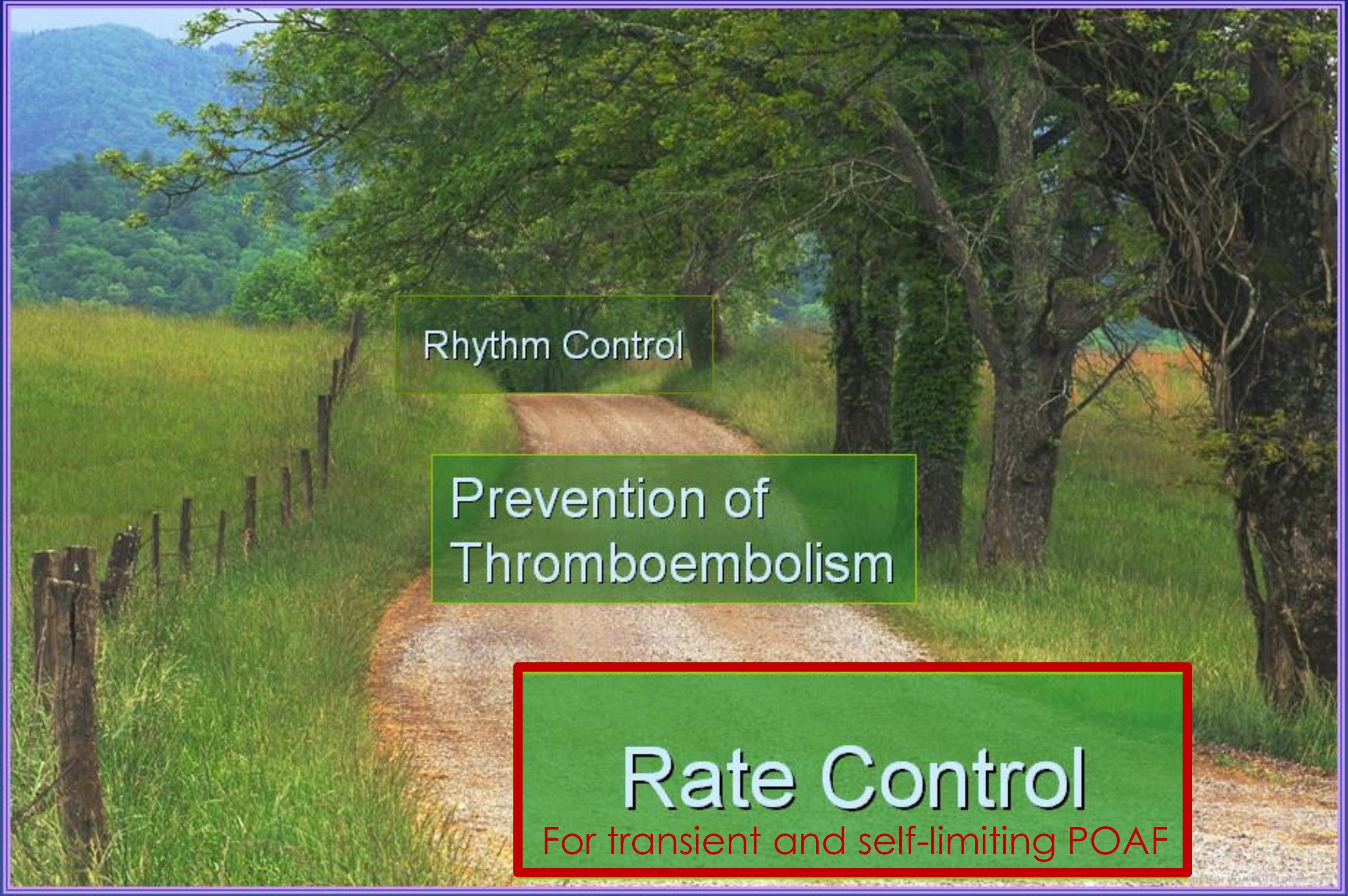
Hazards of postoperative atrial arrhythmias



Ann Thoruc Surg 1993;56:539-49

Priorities in the Management of AF

The Patient Care Pathway



Rhythm Control

Prevention of Thromboembolism

Rate Control

For transient and self-limiting POAF

POAF -- Rate control

- Normal LV systolic function
  - Esmolol 500 mcg/kg IV over 1 min then 60 to 200 mcg/kg/min IV
  - Diltiazem 0.25 mg/kg IV over 2 min then 5 to 15 mg/h IV

POAF -- Rate control

- LV systolic dysfunction/HF
  - Amiodarone 150 mg over 10 min then 0.5 to 1 mg/min IV
  - Digoxin 0.25 mg IV q 2 h, up to 1.5 mg then 0.125 to 0.375 mg daily IV or orally

ข้อควรระวังในการให้ **Amiodarone I.V.**

- Cordarone I.V. is contraindicated in
  -- cardiogenic shock
  -- marked sinus bradycardia
  -- 2° or 3° AV block in the absence of a functioning pacemaker.

Data from: Cordarone I.V. Prescribing Information; Data on file, Wyeth-Ayerst Laboratories.

ข้อควรระวังในการให้ Amiodarone I.V.

- Hypotension : most common adverse effect

-- ขึ้นกับ rate of infusion

การแก้ไขรักษา

-- slowing the infusion rate
-- vasopressor drugs, positive inotropic agents
-- volume expansion

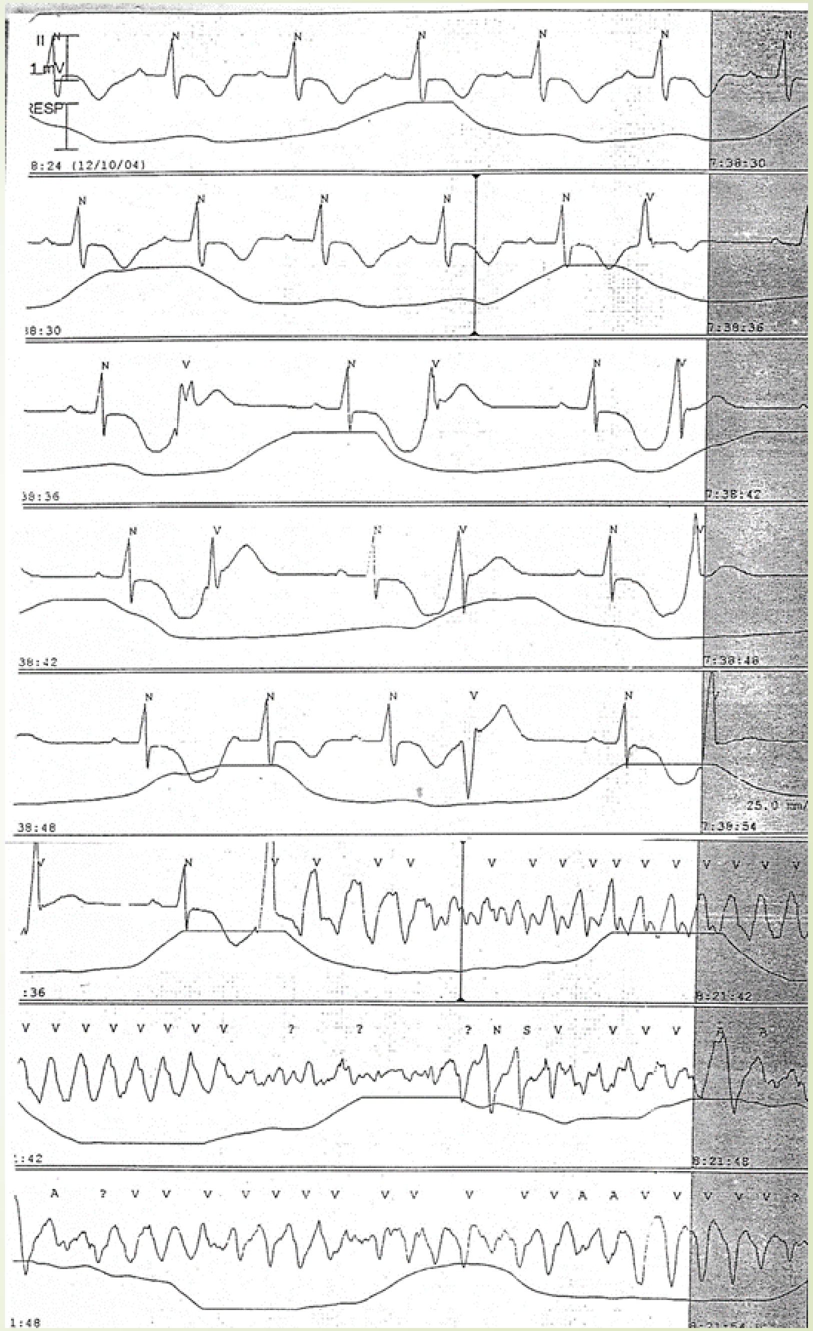
Data from: Cordarone I.V. Prescribing Information; Data on file, Wyeth-Ayerst Laboratories.

ข้อควรระวังในการให้

Amiodarone I.V.

-- convert AF to Sinus Bradycardia
-- QT prolongation
-- torsade de pointes (rare)

แก้ไขรักษา torsade de pointes
-- Mg++ 2 gm iv bolus
-- overdrive pacing 90-105 bpm

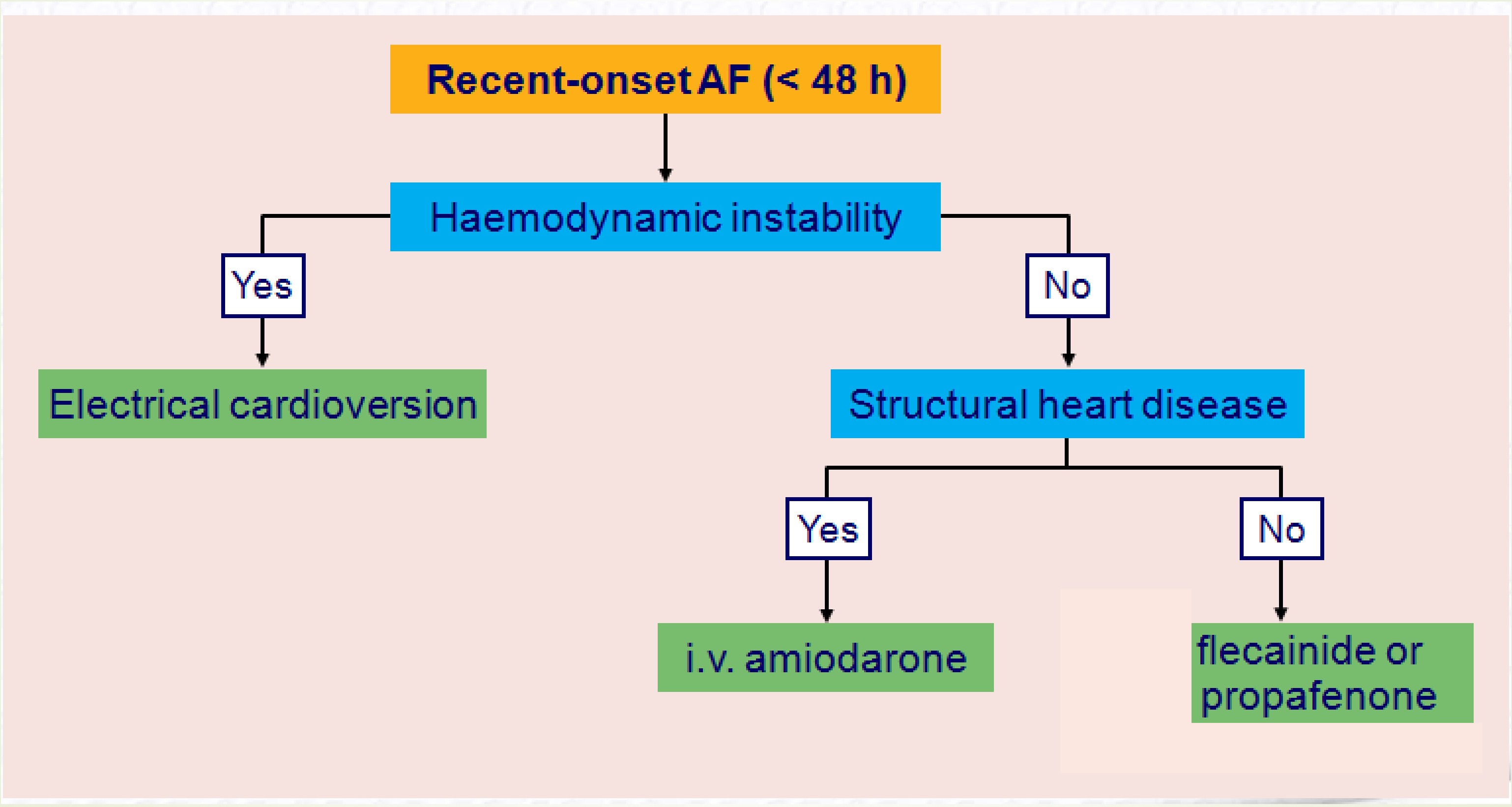


Post-op AF
Candidates for cardioversion

- Acute haemodynamic compromise
- Acute heart failure
- Myocardial ischemia
- Persistent symptoms
- AF does not spontaneously convert to sinus rhythm within 24 hours of rate control

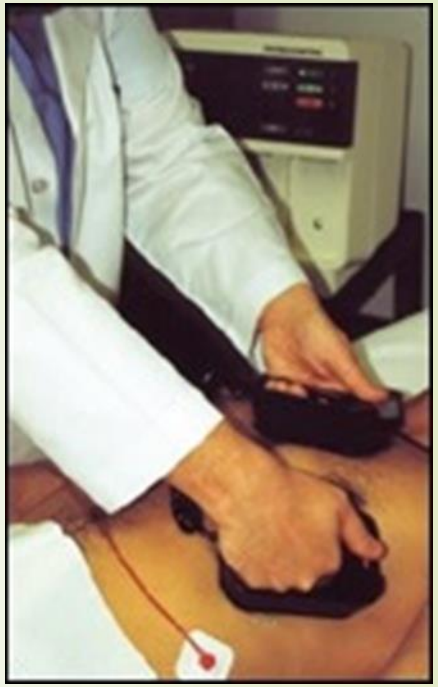
Adapted from ACC/AHA/ESC Practice Guidelines Fuster V et al. J Am Coll Cardiol 2006;48(4):854-906.

Electrical and pharmacological conversion recent-onset AF



AF = atrial fibrillation; i.v. = intravenous.

cardioversion of POAF < 7 days



- Structural heart disease
  Amiodarone 300 mg iv over 30-60 min

  then 1.2 - 1.8 gm/d continuous IV or oral doses until 10 g total,
  then 200 to 400 mg /day maintenance

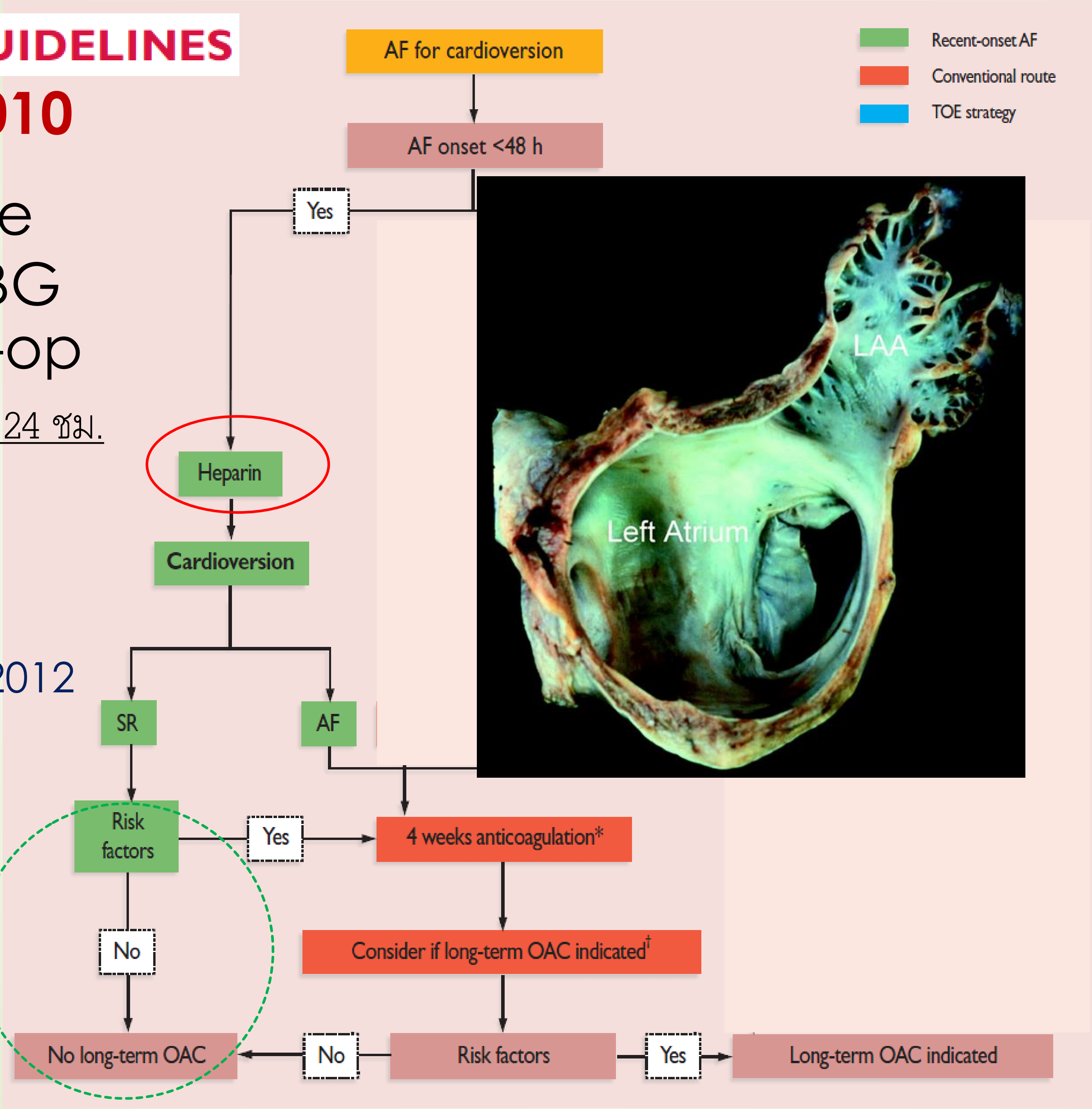
- No or minimal structural heart disease
  Flecainide 200-300 mg oral

  Propafenone 600 mg oral

ESC GUIDELINES
2010

72-yr-old male
CAD s/p CABG
AF 48 ชม. post-op
ถ้าไม่ convert ใน 24 ชม.

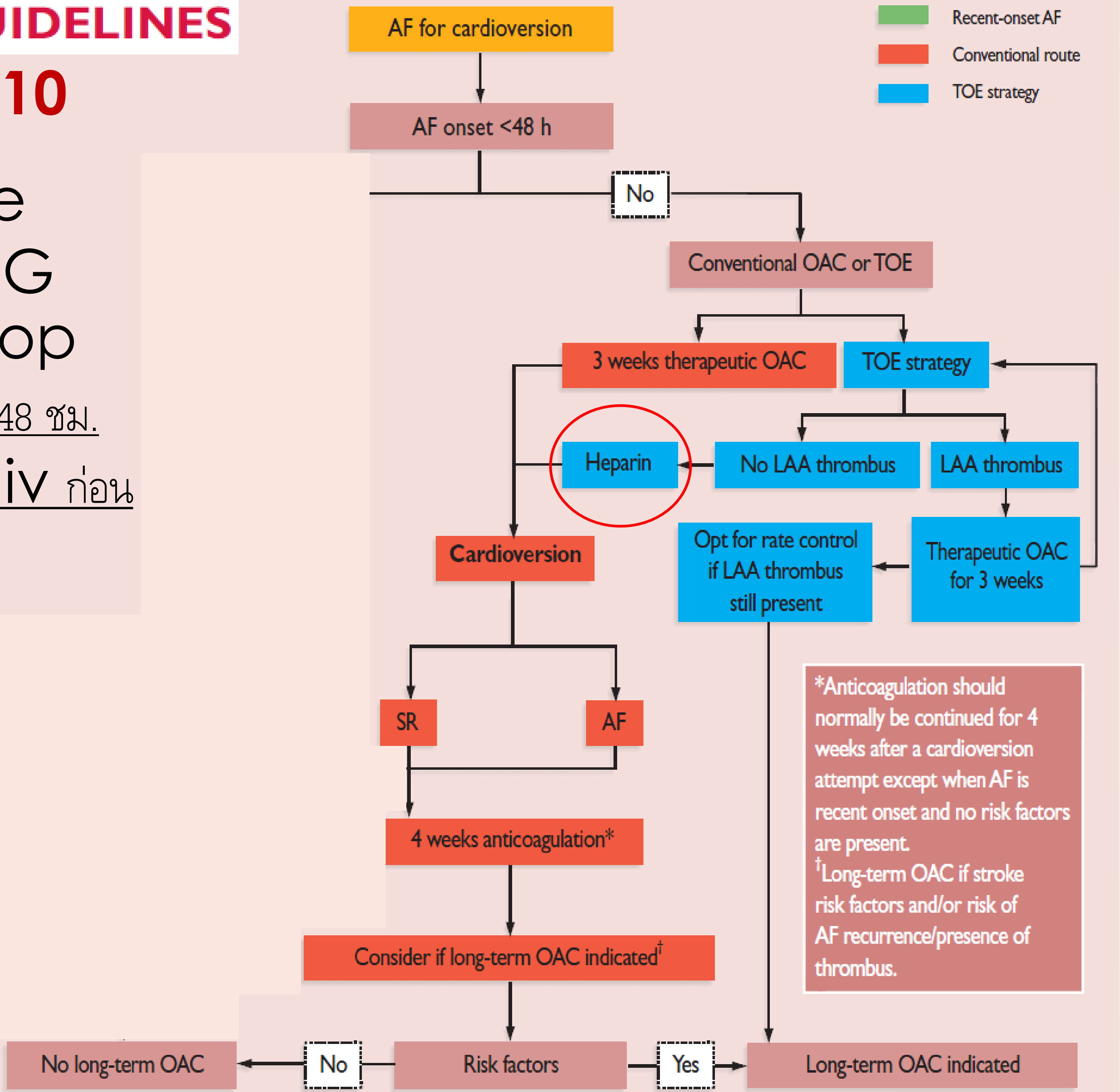
ACCP Guidelines’2012
เห็นต่าง คือ แนะนำ
ให้ anticoagulation
ต่อ 4 wks เสมอ
หลัง cardioversion


AF for cardioversion
AF onset <48 h
Yes
Heparin
Cardioversion
SR
AF
Risk factors
Yes
4 weeks anticoagulation*
Consider if long-term OAC indicated†
No
No long-term OAC
No
Risk factors
Yes
Long-term OAC indicated

🟩 Recent-onset AF
🟥 Conventional route
🟦 TOE strategy

ESC GUIDELINES
2010

72-yr-old male
CAD s/p CABG
AF 48 ชม. post-op
ถ้าไม่ convert ใน 48 ชม.
และไม่ได้ heparin iv ก่อน



AF for cardioversion

AF onset <48 h

No

Conventional OAC or TOE

3 weeks therapeutic OAC

TOE strategy

Heparin

No LAA thrombus

LAA thrombus

Cardioversion

Opt for rate control if LAA thrombus still present

Therapeutic OAC for 3 weeks

SR

AF

4 weeks anticoagulation*

Consider if long-term OAC indicated†

No long-term OAC

No

Risk factors

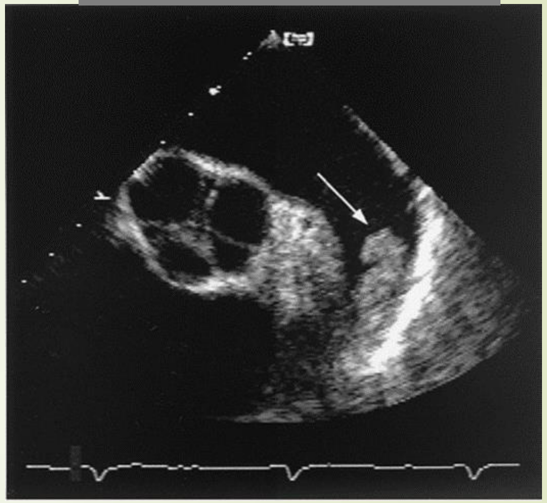
Yes

Long-term OAC indicated

🟩 Recent-onset AF
🟥 Conventional route
🟦 TOE strategy

*Anticoagulation should normally be continued for 4 weeks after a cardioversion attempt except when AF is recent onset and no risk factors are present.
†Long-term OAC if stroke risk factors and/or risk of AF recurrence/presence of thrombus.

AF > 48 hrs



Nonvalvular AF & Risk-based approach to long-term anticoagulation

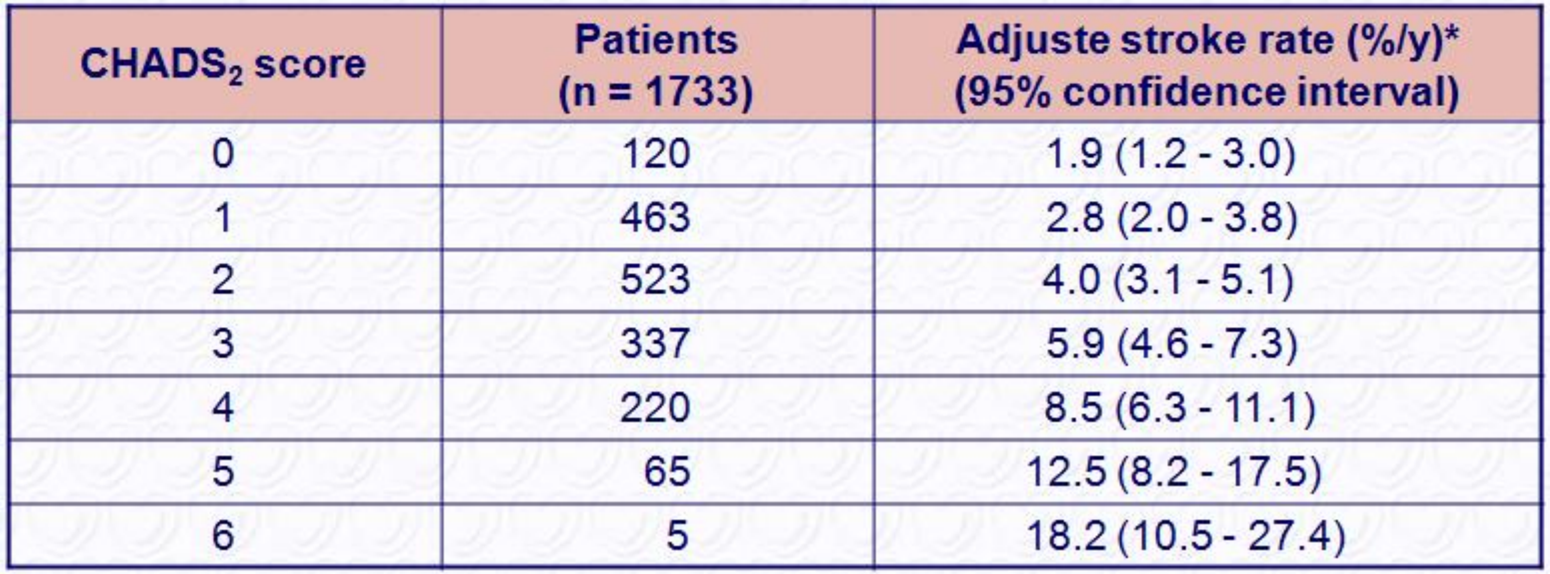
CHF/LV systolic dysfunction (EF<0.35, FS<0.25)
HTN
Age ≥ 75 years
DM
S_2troke: Hx prior thromboembolism

ให้ Warfarin Rx if CHADS$_2$ >1

Weaker/less validated risk factors* (ให้ +extra point)

*Female **
*Age 65-74 years **
*CAD **

$CHADS_2$ score and stroke rate

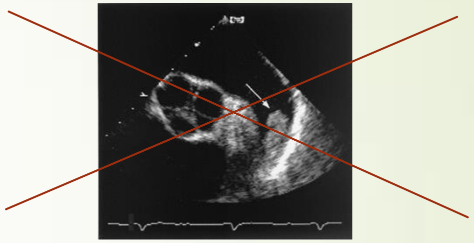


$CHADS_2$ score	Patients (n = 1733)	Adjuste stroke rate (%/y)* (95% confidence interval)
0	120	1.9 (1.2 - 3.0)
1	463	2.8 (2.0 - 3.8)
2	523	4.0 (3.1 - 5.1)
3	337	5.9 (4.6 - 7.3)
4	220	8.5 (6.3 - 11.1)
5	65	12.5 (8.2 - 17.5)
6	5	18.2 (10.5 - 27.4)

*The adjusted stroke rate was derived from the multivariable analysis assuming no aspirin usage; these stroke rates are based on data from a cohort of hospitalised AF patients, published in 2001, with low numbers in those with a **$CHADS_2$ score** of 5 and 6 to allow an accurate judgement of the risk in these patients. Given that stroke rates are declining overall, actual stroke rates in contemporary non-hospitalised cohorts may also vary from these estimates. Adapted from Gage BF et al.

AF = atrial fibrillation; $CHADS_2$ = cardiac failure, hypertension, age, diabetes, stroke (doubled).

72-yr-old male, 3 vessels CAD s/p CABG post-op AF @ 48 ชม., BP 110/70, HR 173, no HF, LVEF 30%



- Management
  ensure adequate pulse oximetry
  check and replace K+, Mg++
  heparin iv if not at high risk of bleeding
  rate control ใน AF with EF ต่ำๆ – ให้ Amiodarone 150 mg over 10 min then 1 mg/min IV

- Follow-up: AF with ventricular response 90's
- 24 ชม.ต่อมากลายเป็น sinus rhythm
- Taper off amiodarone iv เริ่ม oral beta-blocker ทดแทนแทน ค่อยๆ titrate ขึ้น เพื่อ rate control ถ้า AF กลับมาอีก
- ให้ Warfarin long-term เพราะ $CHADS_2$ score มากกว่า 1 | 1 (EF<35%) + (age 65-74) + (CAD)

Prevention of post-op AF

- Oral beta-blocker… เริ่มก่อนผ่าตัด / ไม่หยุดถ้าทานอยู่ก่อนแล้ว
- Amiodarone
  ให้ oral 200 mg tid x 7 ก่อนผ่าตัด แล้วให้ 200 mg OD หลังผ่าตัดจน D/C

  หรือ

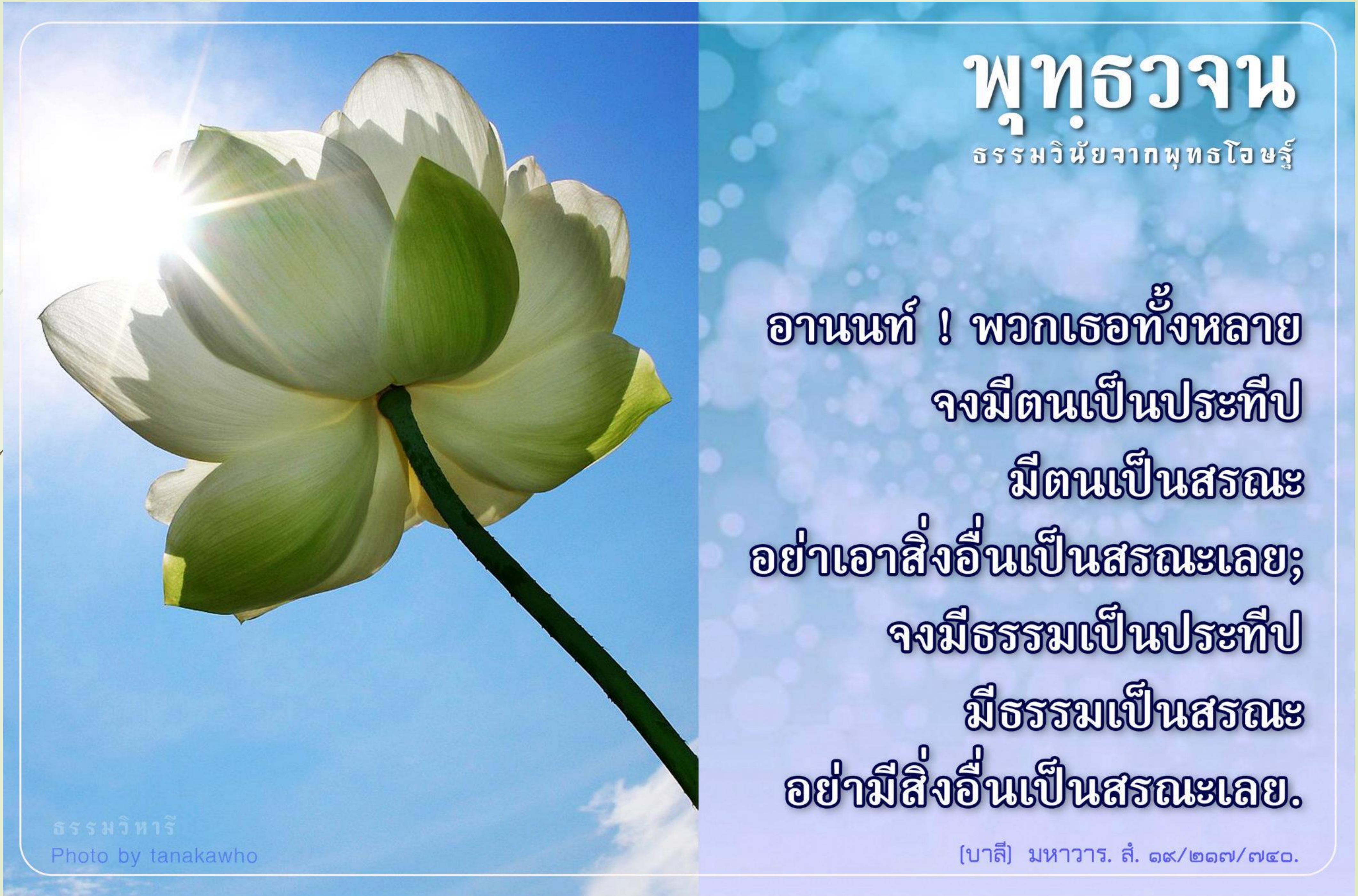
  ให้ iv amiodarone หลังผ่าตัด 1 gm ช้าๆใน 24 ชม. X 2 วัน
- Magnesium supplement for hypomagnesemia
- ??Atorvastatin 40 mg/d ให้ 7 วันก่อนผ่าตัดและให้ต่อหลังผ่าตัด

Other Arrhythmia in the Postoperative Cardiac Surgery Patient

- Atrial flutter… low energy synchronized cardioversion
- PVC
- NSVT

correct oxygenation
correct hypokalemia/hypocalcemia

- VT/VF… defibrillation
  … adrenaline iv
  … sternal reopening for internal heart massage and internal defibrillation
  … Amiodarone iv
  … institute cardiopulmonary bypass



พุทธวจน

ธรรมวินัยจากพุทธโอษฐ์

อานนท์ ! พวกเธอทั้งหลาย
จงมีตนเป็นประทีป
มีตนเป็นสรณะ
อย่าเอาสิ่งอื่นเป็นสรณะเลย;
จงมีธรรมเป็นประทีป
มีธรรมเป็นสรณะ
อย่ามีสิ่งอื่นเป็นสรณะเลย.

(บาลี) มหาวาร. สํ. ๑๙/๒๑๗/๗๔๐.

ธรรมวิหารี

Photo by tanakawho